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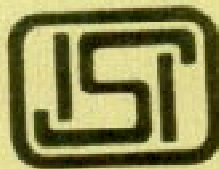
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SPECIFICATION FOR STERILIZER,  
PRESSURE, HOT AND COLD WATER

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# *Indian Standard*

## SPECIFICATION FOR STERILIZER, PRESSURE, HOT AND COLD WATER

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# *Indian Standard*

## SPECIFICATION FOR STERILIZER, PRESSURE, HOT AND COLD WATER

### 0 . F O R E W O R D

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 18 October 1974, after the draft finalized by the Hospital Equipment Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

**0.2** The formulation of Indian Standards on hospital equipment has been taken up at the instance of the Advisory Committee for the Development of Surgical Instruments, Equipment and Appliances, Government of India.

**0.3** This standard is one of a series of Indian Standards on hospital equipment.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

### 1. SCOPE

**1.1** This standard specifies requirements for pressure sterilizer for hot and cold water supply in the operation theatres. The nominal capacities shall be 45 and 90 litres.

### 2. TERMINOLOGY

**2.1** For the purpose of this standard, the nomenclature for various parts of the sterilizer, as indicated in Fig. 1 shall apply.

### 3. DESIGN

**3.1** The water sterilizer shall consist of two cylindrical shells, for hot and cold water supply. One end of the shell shall be closed by a dished end. The other end shall be removable. It shall be designed to operate on electricity or steam from a central source, either independently or in combination, as desired by the purchaser, at a working temperature of 121 °C.

\*Rules for rounding off numerical values (*revised*).

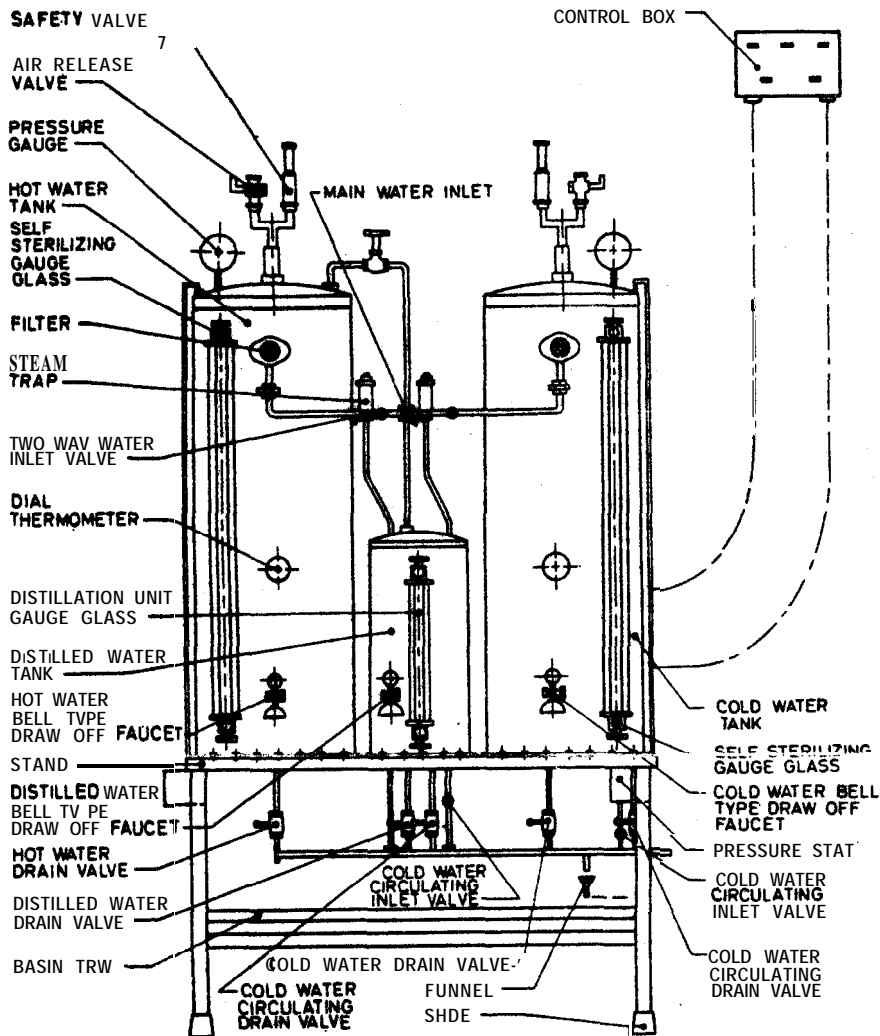


FIG. 1 STERILIZER, PRESSURE, HOT AND COLD WATER



## 4. MATERIALS

4.1 The material used for various components shall be as follows :

<i>Component</i>	<i>Material</i>	<i>Thickness</i>
i) Shell and top end	Stainless steel of Designation 04Cr-18Ni10 of IS : 691 1-1972*	1.5 mm
ii) Flange and removable end at bottom	do	6.25 mm
iii) If removable end at bottom is dished or pressed	do	3.15 mm

4.2 **Safety Valves, Drain Valves, Draw Off Faucets, Gauges, etc** — Gun metal conforming to Grade G or G2 of IS : 306-1968† or Grade 1 or 2 of IS : 318-1962‡ shall be used.

4.3 **Pipes Drain Outlets and Water Inlets** — Brass (with minimum of 60 percent copper) shall be used.

4.4 **Bolts and Nuts** — These shall be of stainless steel conforming to Designation 04Cr18Ni10 of IS : 6603-1972§.

4.5 **Filter** — The filter shall be made from stainless steel of deep drawn quality or *gun* metal.

4.6 **Holding Lugs or Knobs** — Bakelite or ebonite shall be used for holding lugs and knobs.

4.7 **Gauge Glass** — The gauge glass shall be made of suitably treated soda lime glass, borosilicate glass or alumino silicate glass.

## 5. CONSTRUCTION

5.1 The construction of the shell shall be in accordance with best practice and the seams shall be argon-arc welded.

5.2 **Top End** — The top end of the cylinder shall be dished by drawing to a radius which shall be equal to the diameter of the cylindrical shell. The dished end shall be argon-arc welded to the shell at a distance of 25 mm from the top edge of the cylinder.

5.3 **Removable End at Bottom** — The removable end at bottom shall be attached to the shell by bolts and studs.

\*Specification for stainless steel, plate, sheet and strip.

†Specification for tin bronze ingots and castings (second revision).

‡Specification for leaded tin bronze ingots and castings (first revision).

§Specification for stainless steel bars.

**5.4 Stand-This** shall be so constructed that it will withstand normal abuse in handling and transit without any damage to it. Its height shall be  $750 \pm 75$  mm. Provision shall be made to level the stand and eliminate any shake or wobble. It shall have stainless steel top.

**5.5 Safety Valve** — The safety valve shall be of the direct spring-loaded type and shall be so constructed as to permit the steam to escape without increasing the pressure by more than 10 percent over the pressure at which the valve is set to lift. Safety valve shall be locked to prevent the sterilizer being worked at a pressure greater than the designed pressure. The valve shall be attached directly or as close as possible to the sterilizer shell by means of the shortest possible length used solely for that purpose and without any intervening cock or valve.

**5.6 Pressure Gauge** — The sterilizer shall be fitted with a pressure gauge which shall be in accordance with IS : 3624-1966\*.

**5.7 Draw-Off Faucets** — The draw-off faucets shall have the threads in accordance with Designation FPT of IS : 2643-1964†. The valve shall be fitted as close to the sterilizer as possible and shall be of easy-clean design. It shall be provided with an anti-splash bell mouth draw-off nozzle easily removable for maintenance and cleaning.

**5.8 Water Inlet** — The two way water inlet valve on the vessel shall be of the renewable disc diaphragm type with easy-clean cover, and insulated hand-wheel.

**5.9 Water Filter and Steam Trap** — Water filter shall be provided with stainless steel or gun metal mesh and felts laminated together and housed in a gun metal case with glass window. A steam trap shall be provided to drain for elimination of air, condensate and residues.

**5.10 Air Release Valve** -The sterilizer shall be provided with an air release valve having air filter and a vacuum breaking valve.

**5.11 Pressure Stat** — The sterilizer shall be fitted with automatic pressure stat capable of maintaining the water at a pressure not less than the working pressure for electrically operated sterilizer.

**5.12 Thermometer** — Thermometers shall be inserted into the sterilizing cylinders in the middle. The thermometers shall be of the following type :

Dial thermometer bi-metal system accurate to 5 percent of the range over the entire scale.

**5.12.1** Where a thermometer is inserted into a pocket, means shall be provided to ensure adequate thermal conductance between the pocket and the thermometer bulb.

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\*Specification for bow-don tube pressure and vacuum gauges.

†Dimensions for pipe threads for fastening purposes.

5.13 **Cooling Coil** — The sterilizer shell shall be fitted with a cooling coil made from stainless steel tube of wall thickness of not less than 1.6 mm. It shall be free from flats or kinks.

5.14 **Drain Valves** — The sterilizer shall be provided with drain valves in addition to the draw-off faucets and positioned so that the vessel may be completely drained.

5.15 **Self Sterilizing Gauge Glass** — The sterilizer shall be provided with sterilizing gauge glass with guard and automatic valves for safety in case of accidental breakage of gauge glass under pressure.

5.16 If required by the purchaser a distillation tank shall also be provided with the unit as shown in Fig. 1.

## 6. METHODS OF OPERATIONS OF STERILIZERS

6.0 The sterilizers shall be capable of operation on the sources given in 3.1 as desired by the purchaser and shall satisfy the requirements specified therein.

6.1 **Electric Operation**- Electrically operated sterilizers shall have a 3-phase 4-wire supply and the loading shall be as follows :

Capacity Litres	Loading kW
45	12
90	18

An indicator lamp shall be provided on the control box to indicate by glowing when the instrument is 'ON'. The electrical circuit shall have a device to disconnect the heaters from the supply in case of water level falling low or boiling dry. The entire electrical circuit shall be insulated from the sterilizer, housed in a separate control box and the insulation resistance shall not be less than 10M $\Omega$ . It shall also be capable of standing a high voltage test of 1.5kV rms for 1 minute between any point of supply and earth.

6.1.1 Only tubular type immersion heaters (commonly used in commercial heaters flanged type) shall be employed for the purpose. The flange of the elements shall be covered by a metallic case.

6.1.3 The wires used shall be heat resistant and the wiring shall be neatly laid out.

6.2 **Direct Steam Operation** — The steam shall be supplied to the sterilizer at inlet steam pressure of 6 kgf/cm<sup>2</sup> (60 kN/m<sup>2</sup>). The steam coil heaters shall be fitted with a steam-trap and strainer at the outlet end. The strainer shall be combined with the steam trap.

6.2.1 The steam valve shall be tested to 3 times the working pressure and shall be provided to control the steam supply to the coils and its handle shall

be insulated. The steam coils shall be of stainless steel **1.6** mm thick. It shall be designed to stand a hydraulic test of twice the working pressure on completion and the coils shall have no appreciable **flats** or kinks.

6.2.2 At the option of the purchaser, a temperature controlling device may be provided so as to control the steam supply and **maintain the water temperature**.

## 7. **FINISH**

7.1 **All** stainless steel parts shall have a finish not inferior to satin finish.

7.2 All brass and gun metal parts shall be plated chromium over nickel according to Service Grade No. 2 of IS : **4827-1968\***.

**7.3** Welding shall fully penetrate and shall be sound in every detail and it shall be finished flush in the finished stage. There shall be no exposed sharp edges or other unsealed formations which may **harbour** dirt or foreign matter.

## 8. **TEST**

8.1 **Hydrostatic Test** — The sterilizer shall be tested by hydrostatic pressure of twice the working pressure for a period of not less than 10 minutes, without leaking or showing permanent **distortion**.

## 9. **MARKING**

**9.1** The sterilizer shall be legibly and indelibly marked with the following :

- a) Identification of the **manufacturer**;
- b) Wattage, voltage, phase and cycle in case of electrically operated sterilizer;
- c) Code and serial number ;
- d) Maximum working pressure in case of direct steam-operated sterilizer ;
- e) The legend 'NOT TO BE USED IN ANAESTHETIZING SITES'; and
- f) Words 'HOT' and 'COLD' for sterilizer shells.

9.1.1 The sterilizers may **also** be marked with the IS1 Certification Mark.

**NOTE** — The use of IS1 Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The IS1 Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of t&t standard under a well-defined system of inspection, testing and quality control which is devised and supervised by IS1 and operated by the producer. IS1 marked products are also continuously checked by IS1 for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the IS1 Certification Mark may be granted to manufacturers **or processors**, may be obtained from the Indian Standards Institution.

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\*Specification for electroplated **coatings** of nickel and chromium on zinc and **zinc** alloys.

## **10. OPERATING MANUAL**

**10.1** Each sterilizer shall be accompanied by an operating manual which shall contain the following information :

- a) Instructions and directions for installations of the sterilizer and its proper earthing in case of electrically operated sterilizer,
- b) Operation of the sterilizer,
- c) Routine maintenance and service, and
- d) Instructions for use of soft water.

## **11. PACKING**

**11.1** The sterilizer shall be packed as agreed to between the supplier and the purchaser.

# INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

## Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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